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(21) International Application Number: PCT/EP98/03195 (22) International Filing Date: 28 May 1998 (28.05.98) (30) Priority Data: 9800103 11 February 1998 (11.02.98) BE (71) Applicant (for all designated States except US): CURAME [NL/NL]; Marie v. Eijdsden-Vinkstraat 478, NL-3066 HG Rotterdam (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): VAN ROMUNDE, Leo, K., J. [NL/NL]; Stekelbrem 33, NL-3068 TB Rotterdam (NL). KAISER, Claude, Paul [NL/NL]; Benoordenhoutseweg 243, NL-2596 BG Den Haag (NL). (74) Agent: LEHERTE, Georges; K.O.B. N.V., Kennedypark 31c, B-8500 Kortrijk (BE).		(81) Designated States: AU, CA, IL, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>
(54) Title: SYSTEM AND METHOD FOR STEERING INTERRELATED ACTIONS (57) Abstract <p>The invention relates to a method for electronically storing, retrieving and/or modifying records and for sequentially steering a process of interrelated actions in respect of said records, using a computer system comprising a display unit, an input unit, a memory unit and a processing unit, and involving at least one recorded catalogue of recommended actions, in which method: the recorded catalogue(s) of recommended actions comprises/comprise hierarchised sequences of alternative actions, and which method generates electronic forms comprising a list of recommended actions, information-input requests and/or decision-requests, in function of the hierarchised sequences of alternative actions of the catalogue of recommended actions, and in function of the past history of actions. The invention also relates to a computer system programmed to operate such a system.</p> <pre> graph TD subgraph ProcessForms [Process form] direction TB P1[link to : steering algorithm dialogue form additional "actions" related process subform next step in process] P2[] P3[] end subform1[subform] --> EvalForm[Evaluation form] subform2[subform] --> EvalForm EvalForm --> SteeringAlgo((steering algorithm)) SteeringAlgo --> DialogueForm[dialogue form] DialogueForm --> ProcessForms </pre>		

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SYSTEM and METHOD for STEERING INTERRELATED ACTIONS.

- 5 The invention relates to a method for electronically storing, retrieving and/or modifying records and for sequentially steering interrelated actions in respect of said records, using a computer system.
- 10 Methods for electronically storing, retrieving and/or modifying records for office management are generally known.
- Reference is made for instance to the "LOTUS NOTES" software and "LOTUS DOMINO NOTES" software distributed by
- 15 Lotus Development Corporation.
- Such methods are often also adapted, or can be adapted in known ways, to be able to manage sequential actions in an overall procedure.
- 20 The known office management systems referred to above are, by design, easily adaptable for handling various **standardised** procedures (so called "applications" of the basic software), for instance by incorporating a catalogue of actions into the management system, but these known
- 25 systems are not adapted for the needs of **individual** users who use a procedure record as a mere guideline for establishing working procedures suitable to variable individual situations.
- 30 The problem underlying the present invention is to satisfy the needs of the latter type of users of office management systems and to provide them a technical tool for the interactive implementation of interrelated action sequences.
- 35 Applicants of this patent have found a solution to this problem in the new method according to their invention, for electronically storing, retrieving and/or modifying records

and for sequentially steering a process of interrelated actions in respect of said records, using a computer system comprising a display unit, an input unit, a memory unit and a procesing unit, and involving at least one recorded
5 catalogue of recommended actions, in which method the recorded catalogue(s) of recommended actions comprises/comprise hierarchised sequences of alternative actions, and which method generates electronic forms comprising a list of recommended actions, information-input requests and/or
10 decision-requests (so-called dialogue-forms/subforms), in function of the hierarchised sequences of alternative actions of the catalogue of recommended actions, and in function of the past history of actions.

15 In this way the recorded catalogue of recommended actions operates as a unavoidable but adaptable and flexible guideline for the user in the process he is following.

In a preferred embodiment of the invention, the recorded
20 catalogue(s) of recommended actions comprises/comprise electronic selection algorithms in respect of the hierarchised sequences of alternative actions.

According to a further feature of this embodiment of the
25 invention the selection algorithms in respect of the hierarchised sequences of alternative actions are integrated in the electronic forms which are generated by the method.

30 In another preferred embodiment of the invention, which may be combined with other preferred embodiments of the invention, the method is appropriately applied as a procedure of interrelated actions involving a number of sequential procedure steps, wherein for each subsequent
35 step in the procedure the method generates at least one

process-form (which may be hidden, hideable and/or visualisable) and one visible evaluation form.

5 According to a further feature of this embodiment of the invention the evaluation form also comprises information from the records of the system relevant for any decision-request involved in said evaluation form.

10 According to the invention the method may furthermore very suitably involve that a record of all information used/entered when operating the method (i.e. all information contained / involved in all forms, actions, decisions, etc. used in applying the method) is stored in the memory unit of the system, for instance for the purpose
15 of measurements of the effectivity and/or efficiency of effects and/or results of the procedure.

The expression "record" as used here refers to a capability of the method to store information in a retrievable way in the system.

20 In the method according to the invention the recorded catalogue(s) of recommended actions may very easily be updated, which in itself constitutes a distinctive feature of the invention.

25 In still another embodiment of the invention, which may also be combined with other preferred embodiments of the invention, the method may very appropriately involve a supervising organisation for the purpose of quality
30 controll and quality improvement of the method.

Thus the supervising organisation may very appropriately evaluate the effectivity and/or efficiency of effects and/or results based on the records of information (forms, actions and decisions) used/entered, stored during use by
35 several users of the method, in accordance with one of the

preferred embodiments of the invention, and up-date the recorded catalogue(s) of recommended actions in function of said evaluation.

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The invention also provides a computer system for electronically storing, retrieving and/or modifying records and for sequentially steering interrelated actions in respect of said records, comprising a display unit, an
10 input unit, a memory unit and a processing unit, in which said memory unit of the computer system comprises a recorded catalogue of actions with a recommended procedure sequence of the actions, in which
said memory unit of the computer system comprises at least
15 one recorded catalogue of recommended actions involving hierarchised sequences of alternative actions, and said processing unit of the computer system is programmed to generate electronic forms comprising a list of recommended actions, information-input requests and/or
20 decision-requests, in function of the hierarchised sequences of alternative actions of the catalogue of recommended actions, and in function of the past history of actions

25 In the computer system according to the invention the recorded catalogue(s) of recommended actions in the memory unit may very suitably comprise electronic selection algorithms in respect of the hierarchised sequences of alternative actions.

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Preferably the processing unit of the computer system is programmed to integrate the selection algorithms in respect of the hierarchised sequences of alternative actions into the electronic forms.

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According to a further feature of the computer system, its processing unit is preferably programmed to generate one hidden or hideable process-form and one visible evaluation form for each step in the procedure of interrelated actions
5 steered by computer system.

The processing unit of the computer system may also very suitably be programmed to integrate into the evaluation form any information from the records which is relevant for
10 any decision-request involved in said evaluation form, and/or to store a record of the information (forms, actions and decisions) used/entered during the process, into the memory unit of the computer system.

15 The method according to the invention can very suitably serve as a tool for assisting a professional in implementing instructions in an interactive way. More in particular the method can (assist a professional to) implement a series of actions and/or tasks which have to
20 be performed in a defined order, i.e. sequentially, in order to achieve a defined objective.

The method may for instance very suitably provide technical assistance for the (sequential) implementation of series of medical acts sometimes referred to as medical
25 guidelines.

A fundamental feature of the method according to the invention lies in the fact that an hierarchy is assigned to the various steps or forms involved in the method.
30

Another fundamental feature lies in the fact that the recommended procedure sequence is integrated in the steps or forms used in the method.

According to the method a relation is established between
35 the various types of forms, which relation has a certain

order.

The hierarchy makes it possible to transfer a group of forms, such as the forms pertaining to one specific client, in one operation into one file ("Lotus" uses the expression
5 folder). This is achieved by the concept of main files and related files (files with assignments). When transferring a main form all related forms are transferred at the same time.

The users of the method can thus constitute files with any
10 desired content and archive those in any desired way.

A main form can comprise one or more sub-forms. A subform comprises a portion of the form. A subform can be integrated in several forms.

This feature of the known office management systems is
15 mainly used in administrative applications for those parts of the forms which are the same, for instance for letter-heads, adresses, personal data, etc.

In the method according to this invention this feature is
20 applied to allow operating in sequential steps according to a so-called protocol-procedure or guideline-procedure, i.e. according to recommended procedure-sequences.

Guideline-procedures are nowadays considered as an ideal
25 means for managing and controlling both quality and costs. This is particularly the case in medical and wel-fare activities.

In practice there are however no appropriate means to monitor or controll the actual use nor the correctness of
30 guidelines and/or guideline procedures.

In the medical and wel-fare field it is thus for instance not known whether individual practitioners do indeed, in practice, have the guidelines at their dirposal, nor whether they actually use these and with what result.

The quality of recommended procedures depends on the competence and knowledge of those who are responsible for drafting these procedures. Competence and knowledge are, by definition, limited. Recommended procedures or
5 guidelines are therefore no more than the condensation of the knowledge of certain experts at a certain moment. This also involves that for optimal use recommended procedures should always allow proper individual initiative.

10

The method according to the invention allows the user to

- always take notice of the appropriate procedure or procedure step / guideline step, regardless of the overall number of procedures / procedure
15 steps / guideline steps;
- apply or not apply a procedure / procedure step / guideline step;
- judge the eventual effect.

20 The method does therefore not involve a compulsory decision tree.

The method is a **tool** to assist the skilled professional in the optimal decision making based on the knowledge and information available at the moment of decision.

25 The method provides a means for acting in a conscious and testable way.

The technical concepts of the invention, as defined hereabove, can be embodied by application of known office
30 management software, and in particular by means of "LOTUS NOTES" or "LOTUS DOMINO NOTES" software, distributed by Lotus Development Corporation, which constitutes a preferred embodiment of the invention.

35 The following table illustrates the capabilities offered

by the LOTUS NOTES software and the features of the invention specifically requiring these capabilities

5	Feature required by the invention	Capability of LOTUS NOTES / LOTUS DOMINO NOTES
	hierarchy of forms	LOTUS NOTES folders
10	variable content of the process- or guideline-forms for each step in the procedure-sequence (guideline-step forms)	LOTUS NOTES subforms
15	steering via guidelines and guideline steps (for example medical guideline-form and medical evaluation form)	multiple forms having identical sub-forms
	exchangeability of guideline steps	replication capability of LOTUS NOTES
20	exchangeability of process-results (for example results of medical treatments)	replication capability of LOTUS NOTES

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The method according to the invention comprises the following original concepts :

5	Process-forms (Guideline-step forms) involve following features	Evaluation forms involve following features
	links	subforms
	subforms	links to dialogue-(sub)forms
10	next guideline step in default situation	
15	requests for additional tests necessary in current guideline step in default situation	the ability to copy information from guideline step forms

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According to a specific embodiment of the method of this invention, these original concepts may be implemented by incorporating the following features in the process forms and evaluation forms.

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Process form (guideline-step form)	Evaluation form
link to steering (selection) algorithm	steering algorithm subform
link to evaluation-subform and evaluation-subform itself	evaluation-subform
link to dialogue-form	possibility to activate dialogue-form
link to additional tests, subform additional tests and standard completion of additional tests	subform additional tests and completion of additional tests
(optional) link to related procedures (such as clinical trial subforms) and the corresponding guideline-step forms	(optional) related procedure subforms
link to next guideline step in accordance with guideline (steered by algorithm)	possibility to activate next procedure step in accordance with guideline

The main features of the method of the invention, as applied in the embodiment set forth in the above table are further illustrated by **figure 1**, attached to this specification, which schematically represents the links between process forms (guideline-step forms) and evaluation forms via subforms, and the links with dialogue forms and with steering algorithms.

To implement these links the structure for composing the evaluation form is preferably contained in the guideline-step forms.

5 More specifically, the guideline-step forms contain indications about which subforms and dialogue forms are to be used for the evaluation form to be generated from said guideline-step form. This happens most suitably by specifying a name ("short designation") assigned to these subforms and dialogue forms.

10

The following table illustrates what and how this can be done for in particular the guideline-step form and the evaluation form :

5

10

	Guideline-step form	Evaluation form
Name of the guideline step	Name is specified	Name is computed by algorithm subform
Questionnaire- or clinical subform (consultation form)	Name is specified. Subform is then visualised.	Name is retrieved from corresponding guideline-step form. Subform is then visualised.
Request-form for additional tests	Name is specified. Subform is then visualised. Then default settings are specified.	Name is retrieved from corresponding guideline-step form. Subform is then visualised. Then all initial data are retrieved from corresponding guideline-step form.
Steering algorithm subform	Name is specified	Name is retrieved from corresponding guideline-step form. Subform is then incorporated in evaluation subform. It contains one or more fields which are automatically calculated and which establish the next step based on the available information

Dialogue form	Name is specified	Name is retrieved from corresponding guideline-step form. It can be activated by evaluation form. Purpose is to recall additional information required to establish next step.
Link to next step by default	Name is specified	Name is retrieved from corresponding guideline-step form. Name can be used in algorithm to establish next step
Clinical trial subform (optional)	Name is specified Subform is then visualised.	Name is retrieved from corresponding guideline-step form. Subform is then visualised.

5
10 The preferred embodiment of the invention thus allows the creation of a file with unique properties (for instance a medical file) :

- integration of guideline steps in evaluation forms;
- 15 modifying a guideline-form automatically involves modification of the evaluation form;
- easy management of large numbers of guidelines by (expert) supervisor(s), such as a supervising "organisation" or authority, for instance a
- 20 profession-group or association;

- easy distribution of guidelines;
- freedom to deviate from guidelines or guideline steps;
- insight (monitoring) concerning activities and
5 qualitative / quantitative effects

The operation, in practice, of preferred embodiments of the method according to the invention, in particular in the medical area, is illustrated by the following example :

10

In order to operate the method, a coordinating body / centre / authority is required to establish the guidelines. This coordinating centre can for instance be a scientific association or a so called "integral cancer centre", but
15 can also be an individual practitioner, such as a doctor, or partnership of professionals. In addition a managing and/or supervising organisation is required, responsible for distributing the guidelines for / into the method.

20 In practice there will be an exchange of guidelines and/or guidelines between the coordination and supervising centres, and the "workstations", i.e. the participating professionals.

This means also that the knowledge corresponding to a
25 (super) expert becomes available to all users of the method, in the form of measureable guideliness.

In the case of medical applications, the method according to the invention comprises (in analogy with conventional
30 medical "files") :

- 1 - registration-forms, in which all relevant data of the patient can be mentioned;
- 2 - consultation-forms : i.e. guideline-steered
35 forms (see item 5), in which the examination

- results are indicated;
- 3 - request-forms for additional examination/tests;
 - 4 - result-forms;
 - 5 - dialogue screens (forms), on which the doctor
5 can indicate his judgement (the resulting sum of
his conclusions of the examination, the results
of the additional examinations/tests and his
knowledge), and on the basis of which, inter
alia, the next guideline-step or procedure-step
10 is selected;
 - 6- guideline-forms : these forms define, for each
consultation, the content of the consultation-
forms : each time it will look different from a
previous or next one; furthermore the guideline-
15 forms stipulate which test-requests (laboratory-
requests, requests for X-ray photographs,
etc.) should be made in accordance with the
standard guideline step, and , if applicable,
when a next visit should take place. In fact the
20 guideline or procedure will consist of a series
of guideline-forms.

In practice things will proceed as follows :

- 25 1 - A patient comes to a consultation.
- 2 - The doctor or a secretary establishes a new
"file" by filling in the registration form.
- 3 - By means of a dialogue-screen (form), in which
a number of questions are asked, a first
30 guideline-form is selected.
- 4 - The patient visits the doctors consultation.
- 5 - The content of the consultation-form is
established based on the selected guideline-
form. The requests for additional tests (for
35 instance blood- and urine tests, X-ray

photographs, etc.) are already, as a standard, filled in, based on the selected guideline-form. The doctor can always deviate from this proposed standard.

- 5 6 - The doctor decides additional tests : blood and X-ray photography, and completes the request form on the screen.
- 7 - After having received the results on the same day or later the doctor states his opinion in a dialogue-screen.
- 10 8 - The next procedure or guideline step is selected on the basis of this opinion.
- 9 - At the next consultation the guideline determines the content of the consultation form.
- 15 This brings the process back to item 5.

Finally, what is essential, is whether the implementation of a guideline step or deviation from a guideline step leads to the intended effect. For this reason the method of the invention constitutes the basis for effectivity and efficiency measurements on the basis of which guidelines can be corrected and new guidelines can be developed. This can be a task for a coördinating center and/or a scientific association.

- 20 By virtue of this evaluation property the method of the invention therefore constitutes a so-called "Quality System".

The association of the method according to the invention, as a tool, with the effect measurement it allows, gives indeed a very powerfull quality system, which - taking into consideration the freedom for deciding and acting of the individual user :

- 30 - can offer insight in the effects of evaluation

techniques and actions taken (in medical situations of the recovery or improvement in function of the analyses and therapies);

- 5 - can offer insight in the efficiency (such as costs) of evaluation techniques and actions taken;
- can form the basis for correcting the evaluation techniques and actions to be taken.

CLAIMS

- 5 1. Method for electronically storing, retrieving and/or
modifying records and for sequentially steering a
process of interrelated actions in respect of said
records, using a computer system comprising a display
unit, an input unit, a memory unit and a procesing
10 unit, and involving at least one recorded catalogue of
recommended actions, **characterised in that** the recorded
catalogue(s) of recommended actions comprises/comprise
hierarchised sequences of alternative actions, and **in**
that the method generates electronic forms comprising
15 a list of recommended actions, information-input
requests and/or decision-requests, in function of the
hierarchised sequences of alternative actions of the
catalogue of recommended actions, and in function of
the past history of actions.
- 20 2. Method according to claim 1, **characterised in that** the
recorded catalogue(s) of recommended actions
comprises/comprise electronic selection algorithms in
respect of the hierarchised sequences of alternative
25 actions.
3. Method according to claim 2, **characterised in that** the
selection algorithms in respect of the hierarchised
sequences of alternative actions are integrated in
30 electronic forms generated by the method.
4. Method according to any one of the preceeding claims,
characterised in that the process of interrelated
actions steered by the method involves a number of
35 sequential procedure steps and **in that** for each

subsequent step in the procedure the method generates at least one process form and one evaluation form.

- 5 5. Method according to claim 4, **characterised in that** the evaluation form comprises information from the records relevant for any decision-request involved in said evaluation form.
- 10 6. Method according to any one of the preceeding claims, **characterised in that** a record of information used/entered is stored in the memory unit.
- 15 7. Method according to any one of the preceeding claims, **characterised in that** a record of the information and actions used/entered is stored in the memory unit for the purpose of measurement of the effectivity and/or efficiency of effects and/or results of the procedure.
- 20 8. Method according to any one of the preceeding claims, **characterised in that** the method involves a supervising organisation for the purpose of quality controll and quality improvement of the method.
- 25 9. Method according to any one of the preceeding claims, **characterised in that** the method allows for the updating of the recorded catalogue(s) of recommended actions.
- 30 10. Method according to claims 7 to 9, **characterised in that** said supervising organisation evaluates the effectivity and/or efficiency of effects and/or results based on said records of information and actions used/entered, stored during use of the method, and updates the recorded catalogue(s) of recommended actions
35 in function of said evaluation.

11. Method according to any one of the preceding claims,
characterised in that the steering software is an
application embodiment of commercial LOTUS NOTES and/or
LOTUS DOMINO NOTES software.
- 5
12. Computer system for electronically storing, retrieving
and/or modifying records and for sequentially steering
interrelated actions in respect of said records,
comprising a display unit, an input unit, a memory unit
10 and a procesing unit, **characterised in that** said memory
unit of the computer system comprises at least one
recorded catalogue of recommended actions involving
hierarchised sequences of alternative actions, and **that**
said processing unit of the computer system is
15 programmed to generate electronic forms comprising a
list of recommended actions, information-input requests
and/or decision-requests, in function of the
hierarchised sequences of alternative actions of the
catalogue of recommended actions, and in function of
20 the past history of actions
13. Computer system according to claim 12, **characterised
in that** the recorded catalogue(s) of recommended
actions in the memory unit of the computer system
25 comprises/comprise electronic selection algorithms in
respect of the hierarchised sequences of alternative
actions.
14. Computer system according to any one of claim 13,
30 **characterised in that** the processing unit of the
computer system is programmed to integrate the
selection algorithms in respect of the hierarchised
sequences of alternative actions into electronic forms.

15. Computer system according to any one of claims 12 - 14,
characterised in that the processing unit of the
computer system is programmed to generate at least one
process form and one evaluation form for each step in
the process of interrelated actions steered by the
computer system.
16. Computer system according to claim 15, **characterised**
in that the processing unit of the computer system is
programmed to integrate into the evaluation form any
information from the records which is relevant for any
decision-request involved in said evaluation form.
17. Computer system according to any one of claims 12 - 16,
characterised in that the processing unit of the
computer system is programmed to store a record of the
information and actions used/entered during the
process, into the memory unit of the computer system.

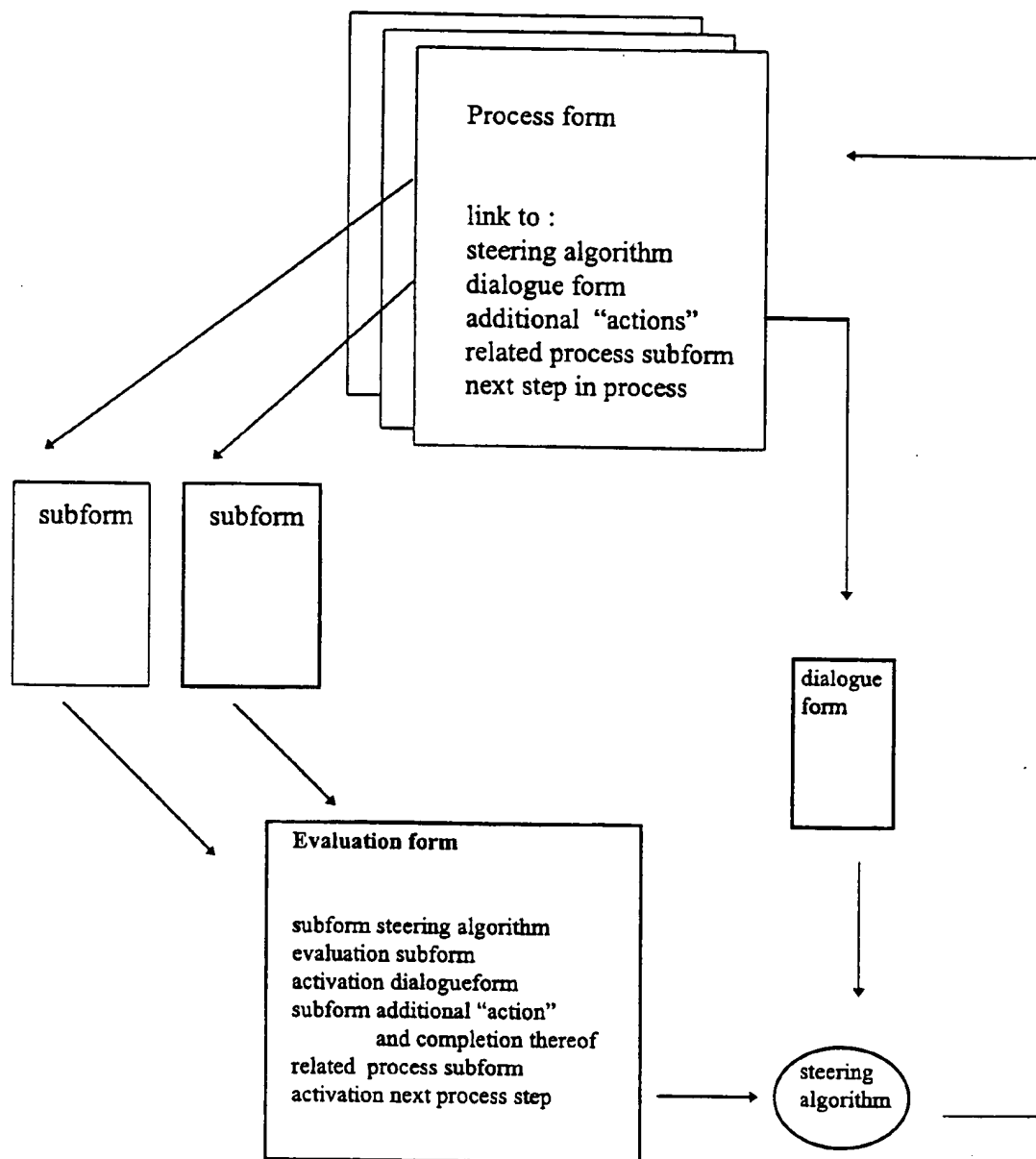


FIGURE 1

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 98/03195

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G06F17/60 G06F19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 583 758 A (KEES JULIE E ET AL) 10 December 1996 see abstract see column 2, line 50 - column 3, line 25 see column 12, line 1 - column 16, line 33; figures 14-18 ---	1, 12
A	WO 94 00817 A (HEALTH RISK MANAGEMENT INC) 6 January 1994 see abstract: claims 1-5 --- -/--	1, 12

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

22 October 1998

Date of mailing of the international search report

04/11/1998

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

Int. ional Application No

PCT/EP 98/03195

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>GORDON C ET AL: "Telematics for clinical guidelines: a conceptual modelling approach"</p> <p>MEDICAL INFORMATICS EUROPE '97, MEDICAL INFORMATICS EUROPE '97, THESSALONIKI, GREECE, 1997, pages 314-318 vol.1, XP002081820</p> <p>ISBN 90-5199-343-9, 1997, Amsterdam, Netherlands, IOS Press, Netherlands</p> <p>see page 315, line 24 - page 317, line 18</p> <p>---</p>	1,8-10, 12
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